

# Electrical Machines and Drives

Lectures WS 2+1

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## Contents of Lectures (1)



*Source: Siemens AG*

- Basics of electro-mechanical energy conversion: Excitation of magnetic rotating fields, forces, induction of voltage in winding systems
- Induction machines:  
Working principle of slip-ring wound rotor and of squirrel-cage rotor machine



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## Contents of lectures (2)

- Drives technology with induction machines: Grid-operated constant speed drives, applications, inverter-fed variable speed drives
- Synchronous machines: Working principle of cylindrical rotor and salient pole rotor machines, generator operation at the grid and in stand-alone application, sudden short circuit, stability at load steps, permanent magnet synchronous machines
- Direct current (DC)-machines: Working principle of modern DC machines, DC-drive technology with converter supply, flux weakening, commutation limits, dynamic equations

### Add-on offers to the lectures:

Tutorials, excursion to industry

Power point presentation (down load), CD ROM

full text book, collection of calculation examples



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## Contents of lectures

1. Preface
2. Rotating Fields in Electric Machines
3. Mathematical Analysis of Air-Gap Fields
4. Voltage Induction in Three-Phase Machines
5. The Slipring Induction Machine
6. The Squirrel-Cage Induction Machine
7. Induction Machine Based Drive Systems
8. The Synchronous Machine
9. Electrically Excited and Permanent Magnet Synchronous Machines
10. DC Drives

